to these stars the constant $0^s{\cdot}037$ was subtracted and the mean of the residuals taken, without regard to sign, with the result—

$$\text{Mean } r = \pm 0^s{\cdot}0145.$$

This corresponds to—

$$\text{Probable difference} = \pm 0^s{\cdot}012.$$

Had this determination been extended to all the stars in the list the probable difference would doubtless be found larger.

Comparison of the Greenwich Ten-Year Catalogue with the Williamstown Right Ascensions of Polar Stars for 1885. By Professor Truman Henry Safford.

It is pretty sure that the personal equation of an observer varies in some degree with the apparent velocity of the star. Hence different observers will, as a rule, assign different right ascensions to slow-moving stars if they determine them, as is usual, by comparison with quick-moving ones. The investigation of this matter can be facilitated by a study of the right ascensions of high northern stars as given in various catalogues. While we cannot say that the systematic differences near the pole are altogether dependent upon personal equation, we can at least infer that this is partly the case.

The *Greenwich Ten-Year Catalogue* for 1880, just published, contains 106 stars in common with the *Williamstown Catalogue of Polar Right Ascensions* for 1885; and the interval of time between them—on the average no more than three or four years—enables a comparison to be made without much uncertainty, due to proper motion.

Such a comparison I have made, employing Professor Auwers's proper motions as given in the Greenwich Catalogue (except in isolated cases, where other values are decidedly better), or, lacking these, proper motions determined by Argelander or by myself from a least-square discussion of all available material.

The primary object of the comparison, together with many others of the same kind which I have made, has been to obtain the means of deducing final corrections to be applied in perfecting a least-square discussion, which I have nearly completed, of 170 stars within 10° of the North Pole.

The following are the results of the comparison, in zones of convenient width. The Williamstown Catalogue contains no stars south of +65°, and only selected stars between +65° and +80°; but between +80° and the pole is nearly complete as far as the seventh magnitude inclusive:—

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Declination.	No. of Stars.	Mean Δα cos δ. W.–G.	Probable Error of 1 Star.	Probable Error of Mean.
° °		s	s	s
86–90	12	+0·0257	±0·0249	±0·0063
84–86	10	+0·0379	±0·0203	±0·0070
82–84	13	+0·0266	±0·0221	±0·0061
80–82	24	+0·0343	±0·0196	±0·0045
77–80	13	+0·0288	±0·0215	±0·0061
74–77	12	+0·0158	±0·0186	±0·0063
70–74	11	+0·0319	±0·0304	±0·0066
65–70	11	+0·0211	±0·0218	±0·0066

The probable errors for one star are derived from the sums of the errors, as compared with the mean of the groups, by the usual formula; their average $\pm 0^{\mathrm{s}}\cdot 022$ is taken to calculate the probable errors of the means; and it will be at once seen that these separate means differ among themselves less, on the average, than the probable errors would require; so that there is no reason why we should not accept the general mean—

$$\Delta\alpha \cos \delta = 0^{\mathrm{s}}\cdot 0283$$

from all the stars as perfectly representing these separate groups.

In other words, the Greenwich right ascensions of polar stars for 1880 are less than the Williamstown right ascensions for 1885 by $0^{\mathrm{s}}\cdot 0283$ sec. δ.

But, on the other hand, when the stars are arranged according to right ascension, we find an apparent slight tendency to periodicity.

I have divided them into seven groups, as follows:—

Limits of R.A. 1880·0.	Mean Δα cos δ.	No. of Stars.	P.E. 1 Star.	P.E. of Mean.
h m h m	s		s	s
0 9–4 2	+0·0369	15	±0·0150	±0·0052
4 3–7 35	+0·0391	15	±0·0170	±0·0052
7 36–12 48	+0·0264	15	±0·0264	±0·0052
13 23–15 39	+0·0206	15	±0·0178	±0·0052
15 45–18 22	+0·0319	15	±0·0297	±0·0052
18 35–21 22	+0·0049	15	±0·0178	±0·0052
21 28–23 54	+0·0381	16	±0·0185	±0·0051

The separate groups here differ from the general mean $+0^{\mathrm{s}}\cdot 0283$, by quantities of the same order as the probable error of the single means, except in the sixth group, $18^{\mathrm{h}}\ 35^{\mathrm{m}}$–$21^{\mathrm{h}}\ 22^{\mathrm{m}}$,

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where the discrepancy is rather more than four times its probable error.

The attempt was made, by comparison between Greenwich and Cambridge, 1875 (Professor Rogers's Catalogue of 1213 stars), to come to a more distinct conclusion on this matter; but the only result was to exhibit a somewhat larger and more extended periodicity in the differences for polar stars, so that I must defer further study on this point till I have accumulated a larger stock of materials.

Williams' College Observatory:
1890 *May* 29.

The Star-Places of the Second Melbourne General Catalogue for 1880. By A. M. W. Downing, M.A.

For the purpose of discussing the star-places of the Second Melbourne General Catalogue for 1880, they have been compared with those of the Cape Catalogue for the same epoch. In some cases different values of the proper motions have been adopted in reducing the observations from the mean dates of observation to the common epoch of the two catalogues. It has, however, been assumed that the effect of the adopted proper motions would not sensibly affect the comparison, when such a large number of stars are available, as is the case in the present instance. Every star common to the catalogues, and which has been observed in both elements in each, has been used in the comparison. Only one *erratum* has been detected during the progress of the work—viz. Melbourne No. 43, for N.P.D. $83^\circ\ 3'\ 5''\cdot27$ read $83^\circ\ 4'\ 5''\cdot27$.

Table I., given below, gives the differences Cape—Melbourne when the stars are arranged in order of N.P.D., and grouped as shown in the table. The columns "curve" give the readings from curves drawn through the several differences, when laid down as points on cross-ruled paper. It will be seen that the mean differences in R.A. and N.P.D. are $+0^s\cdot013$ and $+0''\cdot61$ respectively; and that the total number of stars used in the comparison is 881.

Table II. gives the same details as Table I., the stars in this instance, however, being arranged in order of R.A., and the mean differences having been applied, with reversed signs, to the hourly means before their entry in this table.

Tables III. and IV. are formed by reading off from the curves mentioned above the quantities corresponding to the beginning of each hour of R.A., and each 5° of N.P.D.

By the aid of the tables printed on pages 453 and 454 of